CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER 92-022
(AMENDING ORDER NO. 91-016)

SITE CLEANUP REQUIREMENTS FOR:

UPLAND OPERABLE UNIT
1990 BAY ROAD SITE
EAST PALO ALTO
SAN MATEO COUNTY

DISCHARGERS: RHONE-POULENC INC. AND
SANDOZ CROP PROTECTION CORPORATION

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

1. SITE DESCRIPTION Soil and ground water pollution exist on a site in and adjacent to 1990 Bay Road, East Palo Alto. Figure 1. The site is located about 2000 feet west of San Francisco Bay and about 4500 feet northwest of San Francisquito Creek, a tributary of the bay. Tidal and non-tidal marshes border the site on the east and southeast. Non-tidal marshes are bounded by levees with a portion constructed before 1939 and another portion by 1955.

1.1 Operable Unit Designations The "site" is defined to include areas reflecting arsenic concentrations in soil greater than 20 mg/kg. The total site area lying within the 20 mg/kg contour covers approximately 13 acres. For purposes of remedy selection and remedial planning, the site has been separately divided into "Upland" and "Wetland" "Operable Units" (OU) within the meaning of section 300.430(a)(ii) of the National Contingency Plan (NCP), 40 C.F.R. Part 300. The Upland area is further divided into subareas, according to property ownership. See Figure 2.

1.2 Upland OU Subareas The Upland OU, for which the selected final remedy is specified in this Order, consists of a total of approximately 7.2 acres comprising the following subareas:

- Sandoz Property The "Sandoz Property" located at 1990 Bay Road consists of approximately five (5) acres currently owned by Sandoz Crop Protection Corporation (Sandoz) containing functioning office and manufacturing facilities and a large undeveloped area. The entire Sandoz Property lies within the 20 mg/kg contour. The manufacturing

facilities believed to have caused the contamination were located on what is now the Sandoz property.

- Bains Property The "Bains Property" consists of two parcels totalling approximately 1.5 acres located to the west of the Sandoz property, of which 0.8 acres lie within the 20 mg/kg contour. Improvements on the Bains property include an office and a warehouse, as well as paved and unpaved areas, some of which are used for parking.

- Properties West and North of the Site This designation groups six properties and a small portion of Bay Road itself on which limited amounts of contamination were found during the remedial investigation process. These properties include portions of Bay Road, which is owned by the City of East Palo Alto, and portions of parcels separately owned by Michael J. Demeter, Ronald G. Rogge, and Melvin R. Curtaccio. The Curtaccio properties consist of two parcels north of Bay Road, and one parcel west of the Sandoz property. A total of 1.1 acres of these properties lie within the 20 mg/kg contour.

- PG&E Poleyard The "PG&E Poleyard" is a 0.8-acre portion of the site, formerly used as a pole storage yard, which is currently owned by Pacific Gas & Electric Co. (PG&E). A 0.3 acre portion of this property lies within the 20 mg/kg contour.

2. SITE HISTORY Prior to 1926 the site was occupied by Reed Zinc Company, whose activities are unknown. From 1926 to 1964, the site was occupied by Chipman Chemical Company for the production and formulation of sodium arsenite-based herbicides and pesticides. In 1964, Rhodia Incorporated acquired Chipman and its facility, and continued operation until 1971 when operation ceased. Rhodia changed its name to Rhone-Poulenc Inc. (RPI) in 1978. Chipman and Rhodia are known to have produced arsenic-based pesticides at the site. Chipman and Rhodia formulated sodium arsenite in an underground tank located along the railroad spur and may have disposed of some of the wastes from this process in a shallow sludge pond located on the northwest portion of the site (See Figure 2). These practices are the probable origin of some of the pollutants found in soil and groundwater, both onsite and on adjacent properties. RPI is named as a discharger in the Board's orders because it is the successor-in-interest of Chipman and Rhodia and is deemed responsible for any discharges which may have been made by these entities.

Zoecon Corporation purchased the property in 1972 and has since occupied the site for the purpose of formulating and manufacturing insect control chemicals. Zoecon was purchased in 1983 by Sandoz U.S. Incorporated, who in 1986 merged with Velsicol and at that time renamed the company Sandoz Crop Protection Corporation (Sandoz). Sandoz treats and stores hazardous wastes

under a RCRA permit issued by the California Department of Health Services, Toxic Substances Control Program (now the Department of Toxic Substances Control of the California Environmental Protection Agency; DTSC) as Permit CAT00061135. Sandoz is named as a discharger because of their current ownership of the former RPI property on which the primary arsenic pollution sources occur.

3.0 SITE INVESTIGATION

3.1 Soil In 1980, Converse Consultants began studying the horizontal and vertical extent to which arsenic had contaminated soil in the vicinity of the site. Over 2000 samples have been taken to date at depths ranging from the ground surface to 56 feet. This sampling program identified the extent of arsenic contamination on the site and also the extent of other priority metals, including lead, mercury, cadmium and selenium. The effect of priority metals in the marsh areas of the site is being evaluated in an ecological assessment that is currently in progress.

3.2 Chemicals of Concern Soil and groundwater at the site are polluted with inorganic compounds which are the result of site use by RPI-related companies. Metals detected at levels of concern include arsenic, lead, cadmium, mercury, and selenium. Although other compounds were found at the site, arsenic was judged as the primary contaminant of concern as well as a reliable indicator of contamination by other compounds. Arsenic is almost always found at higher concentrations than the other contaminants of concern.

Some of the chemicals of concern on adjacent properties, particularly arsenic, are believed to derive from the Sandoz property, most likely through surface runoff. The extent of priority metals other than arsenic on adjacent sites may be the result of offsite sources. Additional investigation may be necessary to determine whether other sources of priority metals exist on adjacent properties.

3.3 Background Arsenic The background concentrations of arsenic for the site were evaluated based on three offsite borings and studies by others. The borings were taken in areas which were not likely to be affected by site activities. These concentrations ranged from 7 to 10 mg/kg and averaged 8.5 mg/kg. Another study evaluated reported mean concentrations from east-central San Francisco Bay near Oakland ranging from 6.2 to 18.0 mg/kg and near the Angle Island Buoy from 3.1 to 12.3 mg/kg (Anderlini et al., 1975b). A USGS study measured background concentrations of Bay sediments in borings for western soils from 0.1 to 97 mg/kg (Shacklette and Boerngen, 1984).

From these studies it is concluded that average background for the site is probably about 10 mg/kg, but individual samples may vary significantly from average. Board staff concur with the dischargers' conclusion that soils containing more than 20 mg/kg of arsenic probably have been affected by historic site

activities and for the purposes of this cleanup action will be considered background for arsenic.

3.4 Groundwater The site is underlain by fine-grained and coarse-grained alluvial and shallow marine deposits. The uppermost of these deposits is referred to as the shallow aquifer, which is divided into the upper shallow zone at an average depth of approximately 5 to 15 feet and the lower shallow zone at an average depth of approximately 20 to 40 feet. The flow in the shallow zones is generally to the southeast. The shallow zones are underlain by a clay aquitard to a depth of approximately 160 feet, which marks the beginning of the deep aquifer.

The existing perimeter groundwater monitoring network consists of 20 perimeter monitoring wells and a deep aquifer well, and was approved by the Board as part of Order 85-67. The perimeter monitoring network currently includes the following wells: W-102; W-103; W-104; W-105; W-106; W-107; W-108; W-109; W-110; W-111; W-112; W-113; W-114; W-118; W-119; W-120; W-121; W-122; W-123; and W-124. Wells W-125 and W-126 are currently being installed and sampled and will replace W-108 and W-109 as perimeter wells when completed. The monitoring well network for the deep groundwater zone presently consists of one well, W-101, to determine vertical migration. Pursuant to the Deep Aquifer Monitoring Plan (DAMP) (see Finding 3.1.5), additional wells will be added to the monitoring well network for the deep groundwater zone upon approval of a RAP for the Wetland OU.

The vertical and lateral extent of arsenic pollution in groundwater has been investigated and documented using 84 monitoring wells. The distribution and migration of arsenic, as an indicator for metals contamination, is monitored by a network of wells in the shallow groundwater zones, and by a single well in the deep aquifer.

The extent of other pollutants, such as volatile organic compounds (VOCs) found in groundwater samples from the onsite and offsite wells, have not been as thoroughly evaluated or source(s) determined. VOCs have not been detected in soils onsite, but have been detected in groundwater in a number of wells on the site, most notably along the southern portion near the railroad tracks and offsite along the Borrman Steel Company/Torres property boundary. Though RPI was never named as a discharger of VOCs, the effect of VOCs on proposed remedial actions was considered. Though there is no evidence to indicate Sandoz as a source of the VOCs, as property owners, they are responsible for onsite monitoring of VOCs. Sandoz submitted a Sampling and Analysis Plan for VOCs (VOC SAP) in onsite groundwater monitoring wells to the Board on March 31, 1991. Groundwater samples collected in 1988 and 1989 from 14 wells at the site did not contain detectable levels of pesticides.

3.5 Deep Aquifer Monitoring The existing deep aquifer monitoring program consists of a single well showing no evidence of contamination. The Board staff concluded that the existing deep aquifer well would not provide early warning of potential contamination of the deep aquifer, but that the risks of attempting to install a new well in the aquitard above the deep aquifer to accomplish this goal outweighed the benefits. The Board staff also concluded that additional deep wells should be added to monitor concentrations of contaminants, identify the direction of groundwater flow in the deep aquifer and determine if contaminants have migrated into the aquifer. The Deep Aquifer Monitoring Program (DAMP) submitted on June 29, 1991, shall be revised according to Provision C.1.a. to reflect agency comments.

3.6 Surface Water Surface water runoff from the Sandoz property is directed toward the lower-lying non-tidal marsh and undeveloped Call-Mac property to the east and south, respectively. The runoff creates shallow surface ponds during the winter months. A proposal on control and remediation of the surface water runoff for this area shall be included in the Wetland FS/RAP. A levee runs along the full length of the non-tidal marsh, directly east of the site, separating the tidal and non-tidal areas. The tidal marsh east of the levee is well vegetated and subject to tidal action.

4.0 REPORTS & STUDIES

4.1 Remedial Investigation/Feasibility Study/and Final Remedial Action Plan, Upland Operable Unit RPI submitted a Final Remedial Investigation (RI) Report to all agencies on September 19, 1989. Although the RI was approved by all agencies, an ecological assessment is currently being conducted in the wetlands portion of the site. This assessment shall be used to determine impact on the wetlands and to design appropriate alternatives for cleanup in the Wetland Feasibility Study which is scheduled for submittal in late 1992. RPI submitted a Feasibility Study for the Upland OU (Upland FS) on July 31, 1991. A final version of the Upland FS was submitted on November 1, 1991. The Upland FS was approved by all agencies and submittal of the Upland FS satisfies the requirements of Regional Board Order No. 91-016. The Regional Board staff mailed a Proposed Plan Fact Sheet on October 31, 1991 to all addresses in the vicinity of the site as well as all interested agencies. The Proposed Plan contains the proposed final remedy for the Upland OU and is described in this Order. The technical information contained in the RI, Upland FS and the Proposed Plan is consistent with the requirements of section 25356.1 of the California Health and Safety Code for RAP's and with the requirements of the National Contingency Plan (NCP) for RI's and FS's. The final RAP for the Upland OU will consist of Board Orders 91-016, 91-095, this Order, the RI, Upland FS, and the Regional Board Proposed Plan.

4.2 Baseline Public Health Evaluation A Baseline Public Health Evaluation (BPHE) was conducted following the Superfund Public Health Evaluation Manual

(SPHEM) guidance to assess the public health impacts of the 1990 Bay Road Site, and is included in the Remedial Investigation Report (RI). Following the SPHEM a primary or First Cut Hazard Identification Analysis was used to determine which chemicals should be considered as chemicals of concern at the site.

During the first cut screening those chemicals found at or below background levels were eliminated from further consideration. Chemicals which were found below their respective MCL or 0.1 of their STLC in groundwater and were not detected or detected at or below background in soil were also eliminated. Additionally, chemicals found in groundwater samples from a single monitoring well and were not found in other locations or media were eliminated.

Upon completion of the first cut screening arsenic, cadmium, lead, selenium, mercury, copper, and zinc were identified as chemicals of concern. In the second cut screening chemicals were classified as carcinogens and non-carcinogens. Carcinogens were ranked according to their carcinogenic classifications. A non-carcinogenic effects classification by types of exposure ranked both carcinogenic and non-carcinogenic chemicals by their non-carcinogenic effects. In this screening copper and zinc received the lowest total toxicity indicator scores and were removed from consideration.

The results of the BPHE indicated arsenic, cadmium, lead, selenium, and mercury as chemicals of concern at the site.

4.3 Risk Assessment A Risk Assessment (RA) was prepared by Rhone-Poulenc (RPI) as part of their evaluation of remedial alternatives and is included in the final Upland Feasibility Study. RPI selected exposure scenarios based on their evaluation of the most sensitive receptors identified: short-term, or temporary onsite (Sandoz Plant property) construction workers, and child trespassers. The temporary worker was not intended to be involved with any site remediation. These two RPI scenarios considered inhalation and ingestion as the most likely exposure pathways. RPI considered dermal absorption for arsenic not a significant pathway, and the soil-to-water-to-receptor pathway as incomplete; therefore neither was included in the RA. Elimination of the dermal absorption pathway is consistent with toxicological information for arsenic (see Agency for Toxic Substances and Disease Registry (ATSDR), 1989, "Toxicological Profile for Arsenic", NTIS PB 89-185706, p. 2).

Of five chemicals of concern (arsenic, cadmium, lead, mercury, and selenium), arsenic and cadmium were appropriately evaluated for carcinogenic risk, and all five were also appropriately evaluated for the noncarcinogenic Hazard Index (HI). RPI calculated concentrations for arsenic that could remain in soil and be below the EPA acceptable carcinogenic risk of 10^{-4}, and less than a

noncarcinogenic Hazard Index of 1. These values were calculated as 250 mg/kg for the onsite temporary worker, and 135 mg/kg for the trespassing child.

EPA and the Regional Board did not accept RPI's RA. The main reasons for not accepting the RA were inappropriate selection of exposure scenarios and invalid assumptions used in the risk calculations. EPA considers the long-term resident the most sensitive receptor versus the trespassing child and the most appropriate scenario for setting cleanup levels as required in the NCP. EPA does not consider the trespasser scenario appropriate for most active industrial sites ("Guidance for Superfund Human Health Risk Assessment" December 15, 1989). In the case of the 1990 Bay Road Site, EPA and Board staff concur that a commercial/industrial scenario with long-term onsite workers is an appropriate scenario for setting cleanup levels for onsite areas (Sandoz plant property) versus the long-term resident. Current zoning and the long-range industrial development plans for the general area around the site (adopted by the East Palo Alto Redevelopment Agency) support use of the commercial industrial scenario. The main invalid assumption used by RPI was for acute exposure, whereas chronic exposure is the preferred basis for calculating future risk.

Because the RPI RA was not accepted, EPA requested its contractor, PRC Environmental Management Incorporated (PRC), to prepare a RA. The PRC RA, dated August 27, 1991 is included as an appendix to the Feasibility Study and was used in preparing the Proposed Plan.

In the PRC RA, both the residential and commercial/industrial scenarios considered inhalation and ingestion as appropriate exposure pathways, with the addition of consumption of home-grown vegetables for the residential scenario. Neither scenario considered dermal absorption as an appropriate exposure pathway or the soil-to-water-to-receptor as a complete pathway as discussed below.

The soil-to-water-to-receptor pathway is considered incomplete primarily because both State and Federal criteria for classification of shallow groundwater as a current or future source of drinking water are not met. This is consistent with EPA guidance (December 15, 1989). Even though the RI/FS considers it unlikely that arsenic will impact the deeper groundwater aquifer, and containment of the contaminated shallow groundwater plume is an element of the proposed plan, the final cleanup plan does incorporate a cleanup contingency for the deeper aquifer should concentration of arsenic above background concentration be detected based upon a monitoring program network of shallow and deep monitoring wells.

The PRC RA calculated acceptable soil cleanup levels, or health-based cleanup goals (HBG), for each chemical of concern representing a 10^{-4} cumulative carcinogenic risk, and a HI less than 1. PRC calculated arsenic HBGs of 300

mg/kg for the commercial/industrial scenario, and 70 mg/kg for the long-term residential scenario. These values represent the upper bound (i.e. highest concentration allowed) for all pathways within the carcinogenic risk categories for each scenario.

To evaluate noncarcinogenic risks the chemicals of concern were grouped into 3 noncarcinogenic risk groups according to effects on target organs. Hazard quotients from chemicals of each of these groups were summed to produce a HI for each group. The HI for each group is below an acceptable level of 1. The groupings and their respective HI are contained in Table 1.

The Proposed Remedial Action Plan proposes cleanup levels for arsenic of 70 mg/kg (residential carcinogenic risk) for all offsite properties in the Upland OU, and 500 mg/kg for onsite. The value of 500 mg/kg has been proposed as the onsite arsenic cleanup level, instead of the industrial carcinogenic risk HBG of 300 mg/kg calculated in the PRC RA. This risk management decision is based on the negligible increment of risk between 300 and 500 mg/kg concentration (1.0×10^{-4} to 1.77×10^{-4}), and the increase in cleanup costs due to increasing volumes of affected soil with decreasing arsenic concentration. The proposed 500 mg/kg onsite cleanup level also represents an approximate upper threshold (based upon treatability studies) where Toxicity Characteristic Leaching Procedure (TCLP) test results on untreated soil do not exceed land disposal restrictions and leached contaminant would not be expected to contribute concentrations to ground water greater than drinking water standards for arsenic.

5. REGULATORY STATUS The site has been under investigation since 1980. In 1985, EPA proposed the site for inclusion on the National Priorities List (NPL) under authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as later amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The dischargers proposed a remedial plan to the DTSC in 1986 which was not adopted because it did not meet CERCLA requirements.

From 1987 to early 1991, the site was under the lead agency jurisdiction of the DTSC pursuant to a Consent Order entered into between DTSC, the Board and RPI on August 27, 1987 (Consent Order). The Consent Order established remedial planning procedures for the site. In 1989, EPA formally removed the site from consideration for the NPL under EPA's RCRA deferral policy. Regulation of site cleanup continued under DTSC lead pursuant to the 1987 Consent Order. Lead agency status changed in January, 1991, from DTSC to the Regional Board. The parties vacated all provisions of the Consent Order by stipulation in February 1991, except for those referencing cost recovery. Today, only Board Order Nos. 91-016 and 91-095 directly regulate cleanup activities at the site.

6. BOARD ENFORCEMENT HISTORY The following Board orders have applied to conditions at the site:

- Cleanup and Abatement Order (CAO) 82-001, adopted April 15, 1982 (requiring investigation and abatement of the vertical and lateral extent of soil, surface and groundwater pollution);

- Order 82-002, adopted April 21, 1982 (allowing additional time for completion of tasks);

- Order 82-005, adopted October 13, 1982 (allowing additional time for completion of tasks);

- Order 83-012 adopted December 20, 1983 (allowing additional time for completion of tasks); and

- Waste Discharge Requirements Order 85-67, adopted May 15, 1985 (rescinding previous Orders and requiring the dischargers to conduct further site characterization, construct monitoring well systems in the shallow and deep aquifers, and submit results of groundwater sample analyses).

. Administrative Civil Liability Complaint 87-001

- Site Cleanup Requirements Order No. 91-016, adopted February 20, 1991 (rescinding and replacing existing order to reflect change in lead agency, to include tasks necessary to complete the FS/RAP process, to update groundwater monitoring and to ensure design of an adequate groundwater mitigation response for final site cleanup).

- Site Cleanup Requirements Order No. 91-095 adopted June 19, 1991 (amending Order No. 91-016 to add provisions for implementing an Early Action Removal Plan (EARP)).

7. INTERIM REMEDIAL ACTIONS In 1981, under direction of DTSC, drummed waste and associated polluted soil unrelated to RPI were removed by the parties responsible for the waste from the northern portion of the Torres Property (see Figure 2, Call-Mac Property). Interim remedial actions at the site have included monitoring of groundwater in the shallow and deep groundwater zones with a monitoring well network installed under Board Order 85-67. In March 1987, pursuant to an order issued by DTSC, RPI installed a fence around certain areas of the site corresponding to the approximate 50 mg/kg soil arsenic concentration and posted warning signs.

RPI undertook an Early Action Removal completed in September, 1991, to remove soils containing concentrations of greater than 5000 mg/kg of arsenic from the undeveloped portion of the Sandoz property and the northern portion of the Torres property. The soil was disposed of offsite at a Class I facility in accordance with state and federal land disposal regulations. This was accomplished in accordance with the Early Action Removal Plan approved by Board Order Amendment 91-095.

8. SCOPE OF THIS ORDER This Order presents the selected final remedy for the Upland OU of the 1990 Bay Road site.

This Order deems approved all reports and actions accepted as final pursuant to the Consent Order or by Board Staff in accordance with previous Board Orders. Those reports which have been received and are currently under review include:

Aquifer Characterization and Contingency Plan (ACCP)
Deep Aquifer Monitoring Program (DAMP)

This Order contains a task for modification and finalization of the ACCP and DAMP.

9. THE SELECTED FINAL REMEDY The selected remedial action for the Upland OU is the remedy identified and described as "Alternative E" in the FS and Regional Board Fact Sheet. Alternative E, as discussed in detail in Finding 8.4, consists of removing soil containing high concentrations of contaminants; treating certain soils onsite by means of fixation; capping certain affected areas; imposing deed restrictions on the Sandoz property as well as deed restrictions or removal to 70 mg/kg on the Bains, PG&E poleyard, Curtaccio, Rogge, and Demeter properties; monitoring all groundwater zones and add additional wells as per DAMP; installing a slurry wall to control groundwater migration; and dewatering within the slurry wall as needed to contain the affected soils and groundwater, and to maintain the hydraulic gradient.

9.1 Remediation Alternatives The FS for the Upland OU evaluated cleanup levels and remedial alternatives. RPI evaluated seven alternatives for the Upland OU including no action, removal to background, and five intermediary cleanup levels and technology combinations. A complete description of these alternatives is contained in the FS.

9.2 Summary of Evaluation Criteria Nine evaluation criteria have been developed by EPA to compare alternatives. The alternatives in the Upland FS were developed in detail with respect to these nine criteria, as set forth in the NCP at 40 C.F.R. § 300.430(e). A comparative analysis is set forth in the FS Report, and a summary is provided in section 8.3.

- Overall Protection of Human Health and the Environment This criterion addresses whether a remedy provides adequate protection of human health and the environment.

- Compliance with applicable or relevant and appropriate requirements (ARARs) This criterion addresses whether a remedy will meet all of the ARARs or other federal and state environmental laws.

- Long-term Effectiveness and Permanence This criterion refers to expected residual risk and residual chemical concentrations after cleanup goals have been met and the ability of a remedy to maintain reliable protection of human health and the environment over time.

- Reduction of toxicity, mobility or volume through treatment This criterion refers to the anticipated performance of the treatment technologies a remedy may employ.

- Short-term effectiveness This criterion addresses the period of time needed to achieve cleanup and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

- Implementability This criterion refers to the technical and administrative feasibility of a remedy.

- Cost This criterion includes estimated capital and operation and maintenance, usually presented in a 30-year present worth format.

- Agency Acceptance This criterion addresses the agencies' acceptance of the selected remedy and any other agency comments.

- Community Acceptance This criterion summarizes the public's general response to the alternatives.

9.3 Remedy Selection Rationale and Statutory Determinations The alternatives evaluated in the Upland FS consisted of varying levels of soil removal and/or treatment and groundwater monitoring with containment and/or treatment measures as necessary. The rationale for remedy selection for this site is to protect human health and the environment and prevent further outward migration of contaminants from the site. The selected remedy meets these criteria: removing, treating, and capping soil so that the increased risk of cancer associated with the site is less than 10^{-4}. Additionally, an asphalt cap, deed restrictions and groundwater monitoring and other measures will prevent future contact between humans and contaminated soil or groundwater. Soil will be remediated so as to minimize leaching to groundwater. Intermittent dewatering

within the slurry wall will require treatment and disposal of extracted water in compliance with federal and state discharge requirements.

The selected remedy complies with ARARs, including the Porter-Cologne Water Quality Control Act as enforced by this Board's orders and state and federal hazardous waste disposal requirements for off-site and on-site disposal. In accordance with CERCLA section 121, 42 U.S.C.A. § 9621, and the National Contingency Plan, 40 C.F.R. Part 300, EPA will waive any federal or state permitting requirements for the treatment, storage, and disposal of hazardous wastes that might otherwise apply to the activities contemplated as part of the approved remediation, including but not limited to necessary authority to allow redeposition of treated hazardous wastes.

The selected remedy will be effective over both the short and long term. Soil removal, soil fixation, and capping will significantly reduce the mobility of contaminants at the site. Compliance with ARARs will ensure the short-term effectiveness of the selected remedy during implementation.

The selected remedy is implementable. It relies on proven technologies and can be implemented in a period of ten months, excluding the portions of the remedy that must be deferred until the Sandoz and Bains facilities cease operation. The selected remedy is administratively feasible, effective and has a reasonable cost/benefit ratio.

Other alternatives were considered for the site, but the selected alternative was considered superior when weighed against the 9 criteria and the other alternatives. The NCP prefers treatment as part of the remedy which could reduce toxicity, mobility and volume. Treatment in the case of arsenic polluted soils would not reduce toxicity or volume, but it would reduce the mobility of the arsenic.

9.4 Description of the Selected Remedy The selected remedy for the Upland OU consists of the following measures:

- Remove accessible soils containing concentrations greater than 5000 mg/kg arsenic from accessible areas on the Sandoz property (see Figure 3). (This work was completed under Order Amendment No. 91-095.) Excavated soil has been disposed of offsite at a Class I facility in accordance with state and federal land disposal regulations. Inaccessible soil currently located under areas required for support of facility operations will be removed when the facility ceases operation and the structures are razed. Land disposal restriction rules may require soil treatment prior to disposal;

- Treat accessible soils containing concentrations of 500 mg/kg or greater of arsenic by means of fixation technology, in order to reduce the mobility of contaminants. The treatability goal is 5 mg/l arsenic, 1 mg/l cadmium, 5 mg/l lead, .02 mg/l mercury, and 1 mg/l selenium as measured by the TCLP;

- Record deed restrictions for the Sandoz property as well as any other adjacent property where soil with greater than 70 mg/kg is left in-place, in conformance with Health and Safety Code Chapter 6.5, Article 11, § 25220-41, as modified by the Board in consultation with DTSC.

- Remove soil containing arsenic concentrations above health-based criteria (70 mg/kg) from any properties which will not be deed restricted, and dispose at an appropriate facility in accordance with state and federal land disposal regulations;

- Pave areas that contain surface soil for which data measures arsenic concentrations at greater than 70 mg/kg, after grading to control ponding and maintain surface water drainage to the southeast;

- Monitor arsenic concentrations in shallow and deep aquifers as provided by the approved Deep Aquifer Monitoring Plan (DAMP);

- Install additional monitoring wells and continue the groundwater monitoring program for the site, as set forth in the DAMP, the revised Sampling and Analysis Plan (SAP), and the Aquifer Characterization and Contingency Plan (ACCP). After the implementation of the FS/RAP for the Wetland OU, install a slurry wall to prevent outward migration of arsenic concentrations exceeding 0.05 mg/l in shallow groundwater zone (date for slurry wall implementation shall be specified in the Wetland FS);

- Intermittently dewatering within the slurry wall as necessary to maintain an inward hydraulic gradient; treat extracted groundwater as necessary to comply with Prohibition A.1 of this Order; and discharge treated water to storm drain under an NPDES permit;

The thirty-year net present value of Alternative E, based on a five percent discount rate, is estimated to be approximately $9.1 million, which may increase depending upon the installation date for the slurry wall.

9.5 Deed Restrictions for Adjacent Properties Deed restrictions will be placed on properties where soil containing arsenic concentrations greater than 70 mg/kg remains. The deed restrictions will be similar to those on other Superfund sites under Board lead and will restrict all residential uses, use of shallow groundwa-

ter and disturbance to the protective cap as through excavation. Additional studies under Provision C.1.b. will be conducted in determining which properties will require deed restrictions.

10. CLEANUP STANDARDS

10.1 Soil The BHRA in the Final RI concluded that all potential human receptors have calculated carcinogenic risks less than 10^{-4} before remedial activities, and that in order to protect the most sensitive identified potential receptor (a residential scenario), it would be necessary to prevent contact with soils containing arsenic concentrations greater than 70 mg/kg. Should untreated soils containing greater than 70 mg/kg be left in-place, measures to prevent contact with these soils as well as institutional controls would have to be applied.

10.2 Groundwater The groundwater at this location in the shallow groundwater zone does not meet the criteria set forth in State Water Resources Control Board Resolution 88-63 defining sources of drinking water. The shallow groundwater is not currently used as a source of drinking water and, more importantly, contains total dissolved solid concentrations generally exceeding 3,000 mg/l. However, containment is necessary to prevent migration of arsenic at levels exceeding 0.05 mg/l from reaching the existing perimeter network wells at the site. The 0.05 mg/l criterion corresponds to federal and state maximum contaminant levels (MCLs) for arsenic. Because the deep aquifer has not become contaminated from the metals of concern, no remedial action is necessary at this time. All metals of concern shall not exceed their natural background levels in the deep aquifer.

10.3 Risk Associated with Cleanup Standards The selected remedy is protective of human health as required by Section 121 of CERCLA, in that pollution in soil is treated so that it falls within EPA's acceptable carcinogenic risk range and noncarcinogenic Hazard Index. EPA's acceptable carcinogenic risk range for cleanup standards selected for a site is 10^{-4} to 10^{-6}. If the noncarcinogenic Hazard Index is less than one, EPA considers the combined intake of chemicals unlikely to pose a health risk. Calculated health risks for the proposed cleanup standards are listed on Table 1. The health risk of carcinogenesis from all potential avenues of environmental exposure at the site is less than 10^{-4}, and the Hazard Index for all receptors is less than 1; therefore, the selected final remedy is protective of human health and the environment.

11. DATA VALIDATION Development of the Board's final remedy was based on the Board's evaluation of water and soil data collected over a ten-year period. Data was collected following an approved SAP, and random splits were collected by Board staff to confirm the validity of the data. There has been a reasonable repeatability of data based on monitoring.

RPI submitted a data validation report on June 24, 1991. Board staff forwarded the data validation report to DTSC, the Board contractor for data validation evaluation. DTSC has determined that monitoring data for the Upland OU is both qualitatively and quantitatively acceptable. Thus the Board finds that there is sufficient reliable data on which to base a final cleanup decision.

12. COMMUNITY RELATIONS Community relations activities conducted in conjunction with the Upland FS/RAP have included the following:

- Briefing local officials about the FS/RAP and public participation opportunities;

- Holding an open house and meeting on the EARP in East Palo Alto on May 16, 1991;

- Distributing the Proposed Plan Fact Sheet to all known residences in East Palo Alto, as well as to other interested groups and individuals;

- Placing the Upland FS/RAP in the local information repository located in the East Palo Alto public library;

- Publishing notices in the Peninsula Times Tribune on October 30, 1991 and November 6, 1991, announcing the proposed final RAP and opportunity for public comment at the Board Hearing of November 20, 1991 in Oakland, and announcing the opportunity for public comment at an evening public meeting in East Palo Alto on November 7th. A 30 day comment period ran from November 1, 1991 to December 9, 1991. An extension from December 1 to December 9, 1991 of the public comment period was given to compensate for delays in submitting documents for public review in the information repository. The extension was published in the Peninsula Times Tribune on November 20, 1991.

- Holding an open house and community meeting on the Upland FS/RAP in East Palo Alto on November 7, 1991.

13. ADMINISTRATIVE RECORD The Administrative Record was prepared in accordance with EPA Guidance, has been made available for public review and for review by interested parties, and provides full documentation for the recommendations of staff and decisions by the Board. The record has been updated periodically. Copies of significant reports and an index are available for public access at the East Palo Alto Public Library. The full Administrative Record is available for public access at the office of the San Francisco Bay RWQCB.

14. FINANCIAL RESPONSIBILITY No nonbinding preliminary allocation of responsibility (NBAR) has been completed for this site. RPI and Sandoz have been acting pursuant to an Agreement of Release and Indemnification entered into in February 1986 concerning then-known contamination of the site with inorganic compounds. The Tentative Order names Rhone-Poulenc and Sandoz Crop Protection Corporation as dischargers. The Board will consider NBAR procedures at a future date and may name other parties responsible for VOC, metals or other pollution.

Adjacent and downgradient properties located within the Upland OU are not named as dischargers at this time, although legal basis exists for such an action. Should these property owners fail to cooperate with cleanup efforts at the site, or if additional pollution is identified they may be named as dischargers.

Currently Shell and Maxus Energy (the successor to Diamond Shamrock) are currently conducting investigations on the Torres and Call-Mac properties to determine possible subsurface impacts due to the illegal burial of their wastes by Call-Mac Transportation.

15. LEAD AGENCY The Board has been acting as the lead agency pursuant to a stipulation between RPI, DTSC and the Board dated February, 1991, vacating the August 1987 Consent Order for the site, and to various interagency agreements.

Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985 (as subsequently amended) by the Board, EPA and DTSC, the Board has been acting as the lead agency for the site. The Board will continue as appropriate to regulate the dischargers' remediation and administer enforcement actions in accordance with CERCLA as amended by SARA, the California Water Code, Health and Safety Code, and regulations adopted there under.

Pursuant to CERCLA sections 104 and 122, 42 U.S.C.A. §§ 9604, 9622, EPA will allow Rhone-Poulenc to conduct the remediation described herein.

16. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and groundwater.

17. The Basin Plan for the area identifies the following potential beneficial uses of the groundwater underlying and in the vicinity of the facility:

    a. Industrial process water supply
    b. Industrial service water supply

c. Municipal and Domestic water supply
d. Agricultural water supply

The shallow aquifer has no potential beneficial use as a municipal and domestic supply based on the Total Dissolved Solids (TDS) criteria of State Board Resolution 88-63, "Sources of Drinking Water."

There are no onsite wells currently drawing water from this zone for these or any other purposes. The deep aquifer that underlies the site is a source of drinking water, but pumping of groundwater from this zone has been reduced to prevent saltwater intrusion and land subsidence.

18. The existing and potential beneficial uses of nearby surface waters (San Francisco Bay and San Francisquito Creek) and marshes include:

a. Contact and non-contact water recreation
b. Warm and cold fresh water habitat
c. Fish migration and spawning
d. Commercial and sport fishing
f. Preservation of rare and endangered species
g. Estuarine habitat
h. Wildlife habitat
i. Salt marsh habitat
j. Navigation
k. Shellfish harvesting
l. Industrial service supply

19. The Board's Resolution No. 88-160 encourages maximum feasible reuse of extracted groundwater from remediation projects. The Board will consider the feasibility of reclamation, reuse or discharge to a publicly owned treatment works (POTW) of extracted groundwater. If the Board has determined that, due to the high total dissolved solids of extracted groundwater, reuse or disposal to the POTW may not be feasible, then groundwater extracted from dewatering of the slurry wall will be treated and discharged to the local storm drain under an NPDES permit.

20. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the California Environmental Quality Act, Cal. Pub. Res. Code §§ 21000 et seq. pursuant to section 15321 of the Guidelines, title 14, California Code of Regulations.

21. The Board has notified the dischargers and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for

a public hearing and an opportunity to submit their written views and recommendations.

22. The Board, in a public meeting, heard and considered all comments pertaining to the RAP. The EPA and the DTSC and other appropriate agencies have been consulted regarding the requirements of this Order, agree with them, and further have agreed to provide comments on the reports and actions of Sandoz and/or RPI to the Board and to Sandoz and/or RPI in a timely manner. The DTSC has further agreed not to take any action without prior consultation with the Board, unless immediate action is necessary to protect human health or the environment; if an emergency precludes consultation prior to implementation of any action, consultation shall take place as soon as circumstances allow. The Board has consulted the National Oceanic and Atmospheric Administration, the U.S. Fish & Wildlife Service, the U.S. Army Corps of Engineers, the Bay Area Air Quality Management District, the California Fish & Game Department, the San Francisco Bay Conservation and Development Commission, the County of San Mateo and the City of East Palo Alto prior to issuing this Order. The Board shall seek timely comments on all reports and actions relevant to this Order from these and all other interested federal and state agencies, and shall consider those comments.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code and Section 25356.1 of the California Health and Safety Code, that the dischargers shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State, is prohibited.

2. Significant migration of pollutants through surface or subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of pollutants are prohibited.

B. CLEANUP SPECIFICATIONS

1. The dischargers shall not cause or permit, nor threaten to cause or permit, waste to be discharged or deposited where it is or probably will be discharged to waters of the State and create or threaten to create a condition of pollution or nuisance as defined in Section 13050(m) of the California Water Code, except as authorized by the terms of this Order.

2. The dischargers shall continue to conduct site investigation and monitor activities, as needed, to define the current local hydrogeologic conditions and the lateral and vertical extent of soil and groundwater pollution. Should monitoring results show evidence of pollutant migration, additional characterization of pollutant extent may be required.

3. The cleanup levels for source-area soil shall be consistent with those set forth in Finding 9. All accessible soil containing arsenic concentrations in excess of 5000 mg/kg, therefore, shall be excavated and disposed offsite. Soil containing arsenic concentrations greater than 500 mg/kg will be treated by means of fixation technology. Surface soil containing arsenic concentrations greater than 70 mg/kg shall be capped, except where otherwise excavated and disposed. These levels are health-based and protect human health and the environment. A program of continued groundwater monitoring will monitor the status of pollutants left in the soil.

4. Final cleanup levels for polluted groundwater, onsite and offsite, shall be as provided in Finding 10.2. These levels are in accordance with State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California."

5. The dischargers shall construct and maintain a system of perimeter monitoring well pairs completed in the upper and lower portions of the shallow aquifer which shall be located within 100 feet of the 0.05 mg/l contour for arsenic. Concentrations of arsenic in the perimeter wells must be maintained below the MCL. Concentrations of arsenic and other chemicals of concern in the deep aquifer shall be maintained at background in accordance with the SAP, ACCP and DAMP approved for the site.

C. PROVISIONS

1. The dischargers shall comply with the Prohibitions and Specifications above, in accordance with the following time schedule and tasks. Certain of the following tasks, as noted, amend the description and due dates for tasks appearing in existing Order 91-016.

   a. AMEND DATE FOR ECOLOGICAL ASSESSMENT, PROVISION C.1.j. (SCO 91-016)

      1. TASK: DRAFT ECOLOGICAL ASSESSMENT
         DUE DATE: March 31, 1992

2. TASK: FINAL ECOLOGICAL ASSESSMENT
DUE DATE: August 31, 1992

Description: RPI shall submit a final report on the Wetland Ecological Assessment. The report shall include any revisions resulting from agency review and comment.

b. AMEND DUE DATE FOR WETLAND OU FEASIBILITY STUDY AND PROPOSED FINAL CLEANUP PLAN, PROVISION C.1.h.2. and C.1.i.2. (SCO 91-016)
DUE DATE: November 29, 1992

c. TASK: REVISE ACCP AND DAMP
DUE DATE: 60 days after submittal of agency comments

Description: RPI shall submit revised ACCP and DAMP reports acceptable to the Executive Officer which reflect agency comments.

d. TASK: DEFINE OFFSITE PROPERTIES REQUIRING DEED RESTRICTIONS AND THOSE WHERE REMOVAL WILL OCCUR
DUE DATE: April 1, 1992

Description: RPI shall submit a report acceptable to the Executive Officer defining offsite areas that will be deed restricted and others which will have removal of all soils with greater than 70 mg/kg of arsenic. Additional sampling will be required to determine which sites will shall be deed restricted.

e. TASK: REMEDIAL DESIGN REPORT
DUE DATE: May 1, 1992

Description: RPI shall submit technical reports acceptable to the Executive Officer containing all design plans and detailed schedules for completion of all elements of the selected remedy for the Uplands OU, with the exception of: proposed deed restrictions; remedial steps to be taken after the closure of facilities on the Sandoz and Bains properties; control and remediation of surface runoff and the installation of a slurry wall. A proposal for deed restrictions will be submitted as a separate task under this Order. The other elements will be deferred until the Wetland Operable Unit FS/RAP/ROD is implemented.

The report shall include an evaluation of the potential of soil treated by means of silicate fixation to meet the leachability limits

of: 5 mg/l arsenic, 1 mg/l cadmium, 5 mg/l lead, .02 mg/l mercury and, 1 mg/l selenium as measured by the toxicity characteristic leaching procedure (TCLP), based on a pilot-scale treatability study. In addition, the report shall provide further data on background values for lead, cadmium, mercury and selenium.

f. TASK: PROPOSED DEED RESTRICTIONS
DUE DATE: MAY 1, 1992

Description: RPI shall submit proposed deed restrictions acceptable to all agencies. All properties containing soils with arsenic concentrations greater than 70 mg/kg where removal will not occur are required to have deed restrictions. Removal of the restriction on the deeds would require all soils in excess of 70 mg/kg be removed.

g. TASK: IMPLEMENTATION OF UPLAND OU REMEDIAL PLAN
DUE DATE: January 1, 1993

Description: RPI shall submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in the technical report submitted for Task (c). The report shall also contain a re-installation schedule for monitoring wells WCC-01 and WCC-17.

h. TASK: IMPLEMENTATION OF DEEP AQUIFER MONITORING WELL INSTALLATION
DUE DATE: July 1, 1993

Description: RPI shall submit a technical report acceptable to the Executive Officer documenting the installation of additional deep aquifer monitoring wells as specified in the revised DAMP.

i. TASK: DEED RESTRICTIONS
DUE DATE: January 1, 1993

Description: RPI shall submit to the Board copies of notarized and properly recorded deed restriction documents for properties identified in task (d), and/or where removal of soil with more than 70 mg/kg of arsenic does not occur.

2. The dischargers shall submit to the Regional Board acceptable reports on compliance with the requirements of this Order that contain descriptions and results of work and analyses performed. It is not the Board's intent to duplicate any reports due under Order Nos. 91-016 or 91-095, or due

to any other agency; therefore any reports due concurrently under this Order may be combined. These reports shall include those prescribed below:

a. The dischargers shall submit on a regular basis monthly status reports on compliance with this Order. Reports are due on the 15th day of each month to cover the previous month. Each report shall include at least the following:

    1) Summary of work completed since submittal of the previous report, and work projected to be completed before submittal of next report.

    2) Identification of any obstacles which may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles.

    3) Written notification which clarifies the reasons for noncompliance with any requirement of this Order, and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of noncompliance on achieving compliance with the remaining requirements of this Order.

b. The dischargers shall regularly submit reports to the Board on results of groundwater monitoring. The reports shall be yearly, due on July 31 of each year until quarterly monitoring begins as specified in Order 91-016. At that time, compliance and monitoring reports will be due on the last day of the month following each calendar quarter. All compliance and monitoring reports shall include at least the following:

    1) Tabulated results of annual and then quarterly water quality sampling analyses for all wells specified in the SAP, and updated groundwater pollution plume maps based on these results.

    2) A cumulative tabulation of all well construction details, water level measurements and updated piezometric maps based on these results.

    3) Reference diagrams and maps including geologic cross sections describing the hydrogeologic setting of the site, and appropriately scaled and detailed base maps showing

the location of all monitoring wells and extraction wells, and identifying adjacent facilities and structures.

c. ON AN ANNUAL BASIS, The dischargers shall submit summary status reports on the progress of compliance with all requirements of this Order and propose modifications which could increase the effectiveness of final cleanup actions. The first report shall be due on January 31, 1992, and shall cover the previous calendar year. The report shall include at least: progress on site investigation and remediation, operation and effectiveness of remediation actions and systems, and an evaluation of the feasibility of meeting groundwater and soil cleanup goals.

3. RPI may, by written request, seek a modification or revision of the requirements of this Order or any program or plan submitted pursuant to this Order at any time. This Order and any applicable program, plan or schedule may be modified, terminated or revised by the Board.

4. If the dischargers may be delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the dischargers shall promptly notify the Executive Officer. If, for any reason, RPI is unable to perform any activity or submit any document within the time required under this Order, RPI may make a written request for a specified extension of time. The extension request shall include a justification for the delay, and shall be submitted in advance of the date on which the activity is to be performed or the document is due. The Board staff may propose an amendment to the Order and bring the matter to the Board for consideration.

5. Nothing in this Order is intended or shall be construed to limit or preclude any right RPI has or may have to seek administrative and/or judicial review of any orders or determinations of the Board and/or its staff.

6. All technical plans, specifications, reports and documents shall be signed by or stamped with the seal of a registered geologist, registered civil engineer, or certified engineering geologist.

7. All samples shall be analyzed by State certified laboratories, or laboratories accepted by the Board, using approved EPA methods for the type of analysis to be performed. All laboratories or the consultant shall maintain quality assurance/ quality control records for Board review for a period of six years.

8. The dischargers shall maintain in good working order, and operate in the normal standard of care, any facility or control system installed to achieve compliance with the requirements of this Order.

9. Copies of all correspondence, reports, and documents pertaining to compliance with the requirements of this Order shall be provided to the following agencies:

   a. Hetch Hetchy Water District
   b. San Mateo County Health Department
   c. City of East Palo Alto
   d. California Environmental Protection Agency, Department of Toxic Substances Control
   e. U.S. EPA, Region IX (H-6-3)

10. The dischargers shall permit, within the scope of each of their authorities, the Board or its authorized representative, in accordance with Section 13267 (c) of the California Water Code:

   a. Entry upon dischargers' premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.

   b. Access to copy any records required to be kept under the terms and conditions of this Order.

   c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

   d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

11. Sandoz shall file a report in a timely manner on any changes in site occupancy and ownership associated with the facility described in this Order.

12. If any hazardous substance is discharged in or on any waters of the State, or discharged and deposited where it is, or probably will be discharged in or on any waters of the State, the dischargers shall report such a discharge to this Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-office hours. A written report shall be filed with the Board within five (5) working days and shall contain information relative to: the nature of the waste or pollutant, quantity involved,

duration of incident, cause of spill, Spill Prevention, Control and Countermeasure Plan (SPCC) in effect, if any, estimated size of affected area, nature of effects, corrective measures that have been taken or planned, a schedule of these activities, and persons notified.

13. Except as superseded by adoption of this Order, Site Cleanup Requirements Order Nos. 91-016 and 91-095 shall remain in effect.

14. Any provisions of this Order substantially identical to provisions which the State Water Board or a court of law determines to be in excess of the Board's legal authority shall have no force or effect in this Order.

15. This Order is intended to be the primary regulating document by which site cleanup for the Uplands OU shall proceed with the Board as lead agency.

16. The Board will review this Order periodically and may revise the requirements when necessary.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on February 19, 1992.

Steven R. Ritchie
Executive Officer

TABLE 1 - PROPOSED CLEANUP STANDARDS
1990 BAY ROAD SITE, EAST PALO ALTO

CHEMICALS OF CONCERN[a]	BACK-GROUND (mg/kg)	CLEANUP STANDARD[b] (mg/kg)	RISK PARAMETERS	
			Cancer Risk	Hazard Index
ONSITE [c]: ***Based on Commercial/Industrial use scenario with inhalation, ingestion exposure pathways***				
Lead(B2)[d]	50	450[e]	-	BKU
Arsenic(A)	20	500	1.8E-4	0.25
Cadmium(B1)	1.5	1,000	0.2E-4[f]	0.5
Mercury(D)	4	300	-	0.5
Selenium	4	6,000	-	1.0[g]
Total Excess Cancer Risk (rounded)			2E-4	
Segregated Noncarcinogenic Risk *Renal (Cd + Hg)* *Neurologic (Pb + Hg)* *Dermal (As)*				1.0 0.5[h] 0.25
OFFSITE [i]: ***Based on Residential future use scenario with inhalation, ingestion exposure pathways***				
Lead(B2)	50	120[e]	-	BKU
Arsenic(A)	20	70	1E-4	0.14
Cadmium(B1)	1.5	250	.08E-4[f]	0.5
Mercury(D)	4	100	-	0.5
Selenium	4	2,000	-	1.0[g]
Total Excess Cancer Risk (rounded)			1E-4	
Segregated Noncarcinogenic Risk *Renal (Cd + Hg)* *Neurologic (Pb + Hg)* *Dermal (As)*				1.0 0.5[h] 0.14

NOTES:

a) See Appendix K, Remedial Investigation Report.

b) Most health-protective standards calculated for industrial and residential land use scenarios, based on carcinogenic or noncarcinogenic effects.

c) Onsite includes the operating Sandoz Plant property.

d) Parenthetic notation is carcinogenic classification.

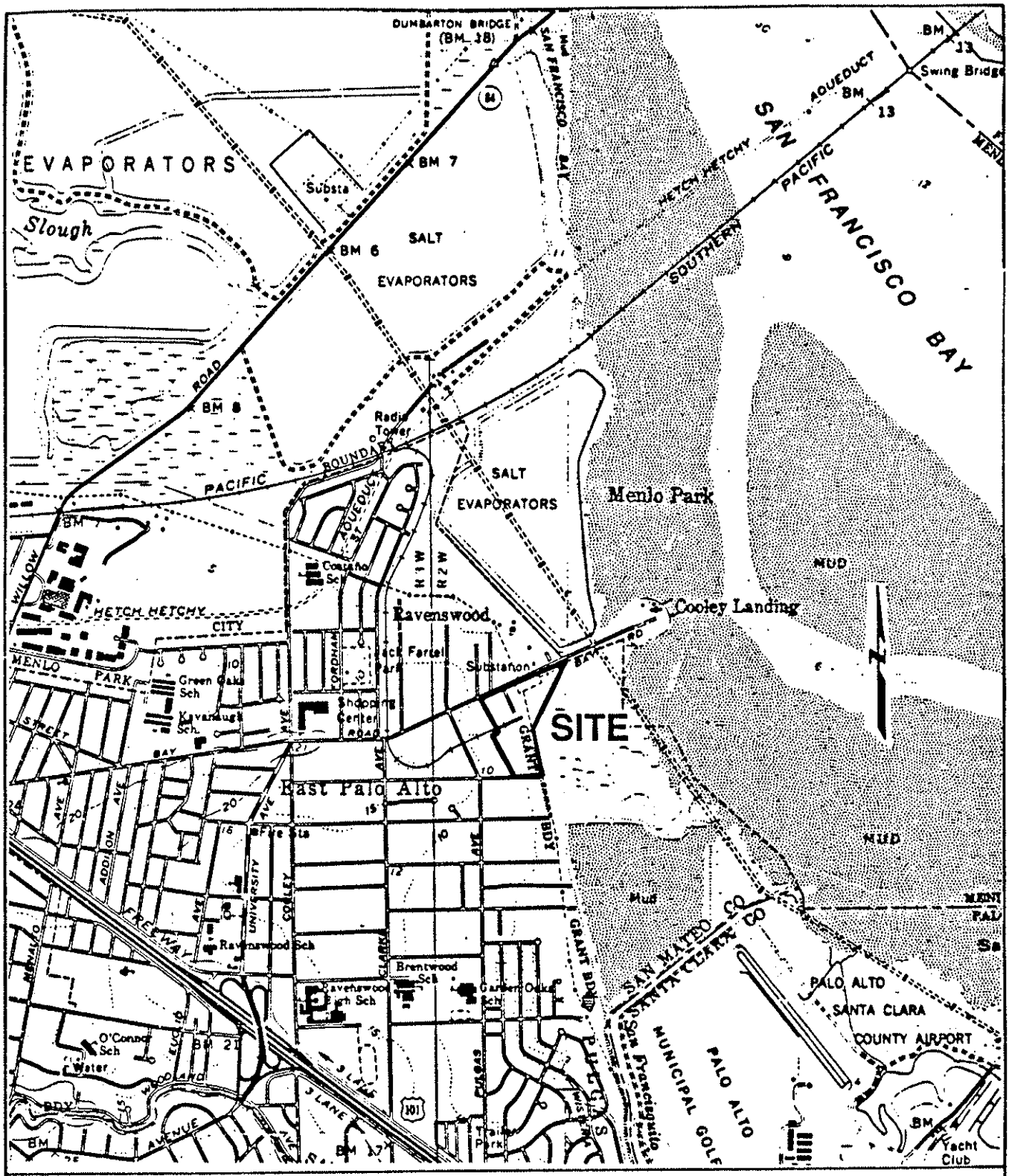
e) Based on EPA's preferred method, Lead Uptake/Biokinetic (BKU) model (Version 0.5, April, 1991).

f) Based on inhalation exposure pathway only.

g) Risk management decision not to include selenium in segregated risk because of low concentration in soil, low degree of toxic effect to humans, and beneficial antigonistic interaction with other chemicals of concern.

h) Contribution of lead to neurologic effects cannot be quantified in terms of Hazard Index.

i) Offsite includes adjacent Bains, Curtaccio, Rogge, Demeter, PG&E and City of East Palo Alto properties.



Source: USGS 7.5 minute series (topographic),
Palo Alto and Mountain View Quadrangles

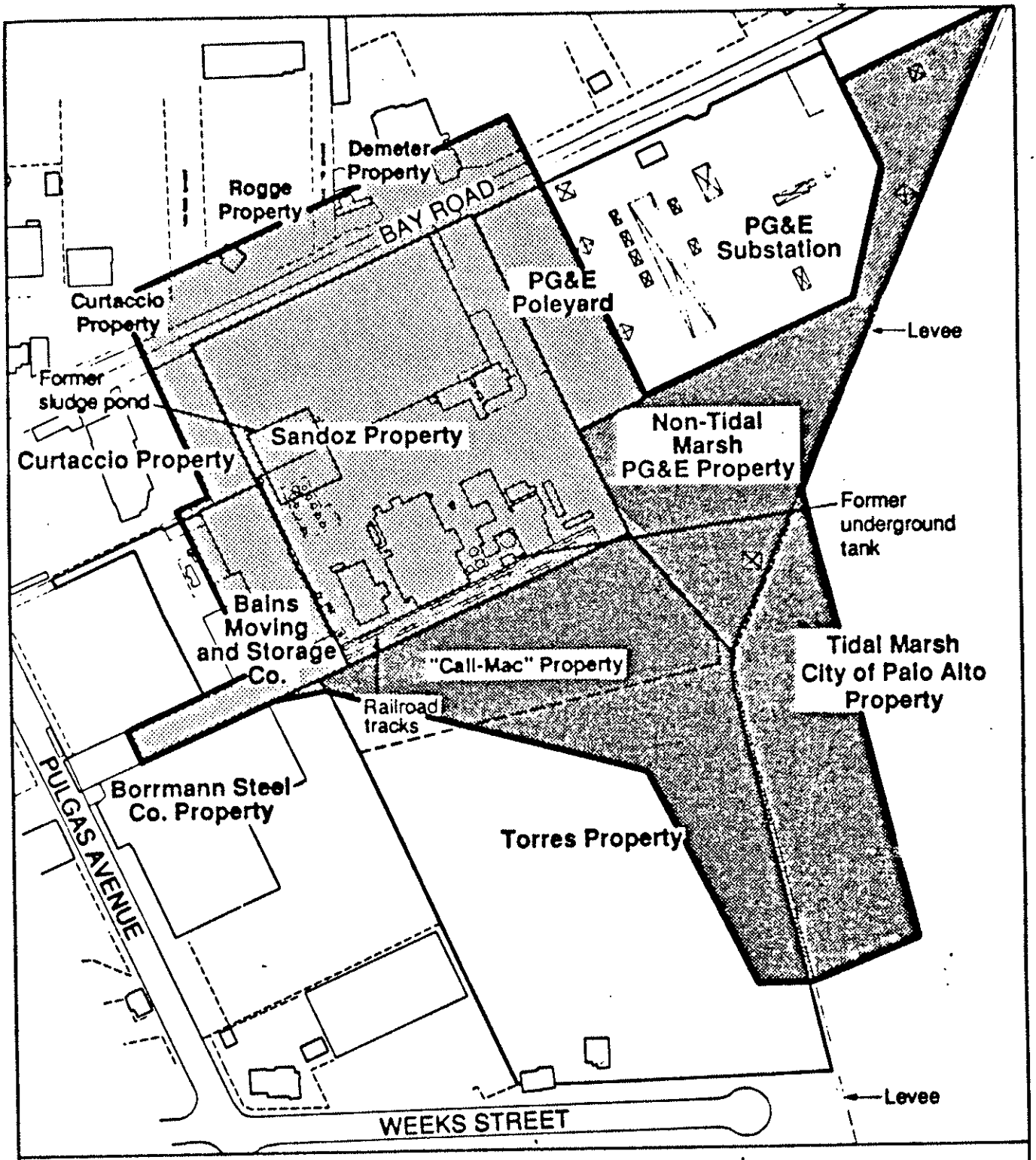
0 2000 Feet

GEOMATRIX

SITE LOCATION MAP
1990 Bay Road Site
East Palo Alto, California

Figure
1

Project No.
1220F

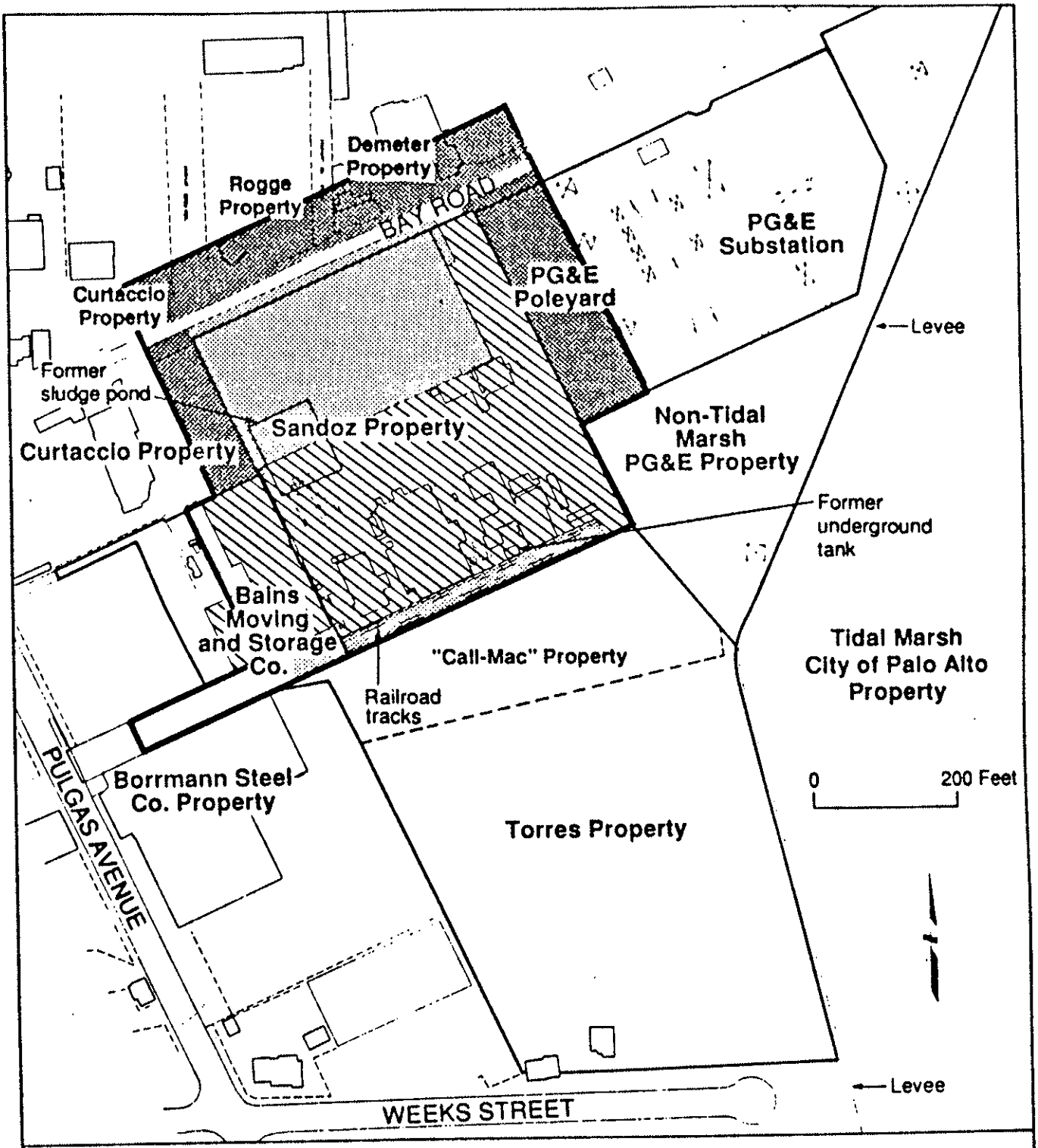


GEOMATRIX

SITE AREA DESIGNATIONS
1990 Bay Road Site
East Palo Alto, California

Figure 2

Project No. 1220F



EXPLANATION

- Currently unpaved areas to be paved under Alternatives B through F (Includes deed restrictions on properties)
- Inaccessable areas in Upland Operable Unit to be remediated in the future under Alternatives B through F
- Currently unpaved areas where soil with arsenic concentrations in excess of 70 mg/kg will be removed or the deed restricted and the surface paved under Alternatives B through F

GEOMATRIX

PROPOSED REMEDIATION PLAN
UPLAND OPERABLE UNIT
1990 Bay Road Site
East Palo Alto, California

Figure 3

Project No 1220F